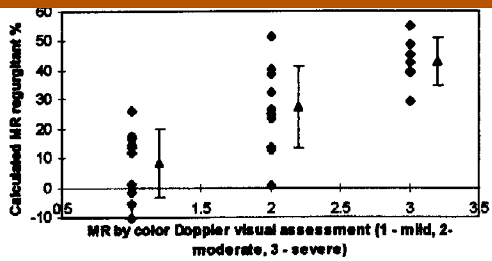

Thus, mitral regurgitant fraction can be calculated using the mitral and aortic valve continuous wave Doppler recordings. This method is quantitative, objective, and non-gain dependent.

1025-94 Color Doppler Imaging of the Proximal Jet is a Good Reflector of *Vena Contracta* Area of Regurgitant Jets: *In Vitro* Studies using Laser Induced Fluorescence Imaging

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The width of the color Doppler proximal jet region has been shown to correlate with regurgitant orifice size. However, no studies have compared proximal jet width (PJW) to the *vena contracta* area (VCA), the true measure of effective orifice area for regurgitant jets. We have previously developed and validated an *in vitro* laser induced fluorescence (LIF) imaging technique which provides gold standard quantification of the VCA. *Methods:* Using this LIF technique simultaneously with color Doppler, we imaged steady flow (60–115 cc/sec) through rigid regurgitant sized orifices (0.196–1.767 cm^2) in an *in vitro* flow phantom. PJW was measured at the narrowest point of the color Doppler flow field immediately distal to the flow convergence region. Color Doppler gain (minimum), filter (medium wall filter) and pulse repetition frequency (4 kHz) settings were kept constant through the study. *Results:* LIF imaging showed that the VCA region was found between 0.1 cm and 0.5 cm distal to the orifices for all flow rates and orifice sizes, corresponding to the region for color Doppler PJW measurements. Increasing flow rate produced no significant change in PJW or VCA. PJW correlated well to VCA for all orifice sizes and flow rates ($y = 7.45x + 6.37$; $R = 0.982$; $N = 15$; SEE = 1.31 cm/cm^2) although the poor lateral resolution of the color Doppler system produced color signatures past the edges of the *vena contracta* resulting in overestimation of actual VCA diameter. *Conclusions:* Color Doppler imaging of the regurgitant proximal jet width is a promising technique that accurately reflects the location and size of the *vena contracta* and is independent of flow rate. It should provide a good addition to the clinical repertoire of non-invasive techniques for estimating the severity of valvular regurgitation.

1025-95 Should we Search for a Flow Independent Index of Aortic Stenosis?

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All echo-Doppler indices of aortic stenosis have shown to depend on transvalvular flow rate. This phenomenon is believed to be related to the existence of an aortic orifice enlargement reserve (OER), designating the capacity of the valve to increase its effective area when flow is augmented. We hypothesized that OER may play a major role in the hemodynamic load imposed the stenotic valve. Therefore, we performed hemodynamic calculations in 47 patients who followed an echo-Doppler dobutamine test. Aortic valve area, resistance, cardiac output and derived parameters were calculated from echo-Doppler recordings at baseline and at peak (up to 20 μg/kg/min) dobutamine-induced mean systolic flow rate.

Results: Following a 54% increase in cardiac output (from 3.4 ± 1.7 to 5.3 ± 2.1 l/min; $p < 0.0001$), valve area increased from 0.52 ± 0.25 to 0.64 ± 0.27 cm^2 ($p < 0.0001$), yielding an OER = 0.11 ± 0.14 cm^2 (range from −0.1 to 0.56 cm^2). Valve resistance declined by a mean of 3% (from 463 ± 249 to 428 ± 213 dynes/s/cm^5; $p = 0.02$) while peripheral resistance decreased by 33% (from 2026 ± 843 to 1292 ± 549 dynes/s/cm^5; $p < 0.0001$). Subsequently, the ratio of ventricular work imposed by the stenotic valve relative to the work required for perfusion of the periphery (Wv/Wp) increased a 46% (from 0.7 ± 0.3 to 0.9 ± 0.4; $p < 0.0001$). Once normalized to the increase in cardiac output, the change observed in Wv/Wp inversely correlated with the OER ($r = -0.44$; $p = 0.002$) but neither to baseline values of valve area ($r = 0.2$) nor valve resistance ($r = -0.07$).

Conclusions: Under flow variations, the orifice enlargement reserve modulates the hemodynamic burden imposed by aortic stenosis. This capacity of the valve to increase it's effective area cannot be adequately assessed at baseline. Searching for a flow-independent index of severity may therefore be inappropriate.

1025-96 Evaluation of Tricuspid Regurgitation Severity: Echocardiographic and Clinical Correlation

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The correlation between the echocardiographic markers of tricuspid regurgitation (TR) and its physical signs has never been previously studied. Therefore, we studied this correlation in 66 consecutive patients (pts.) with more than mild TR, based on jet area (JA)/RA area ratio of ≥ 20%. Thirty eight pts. (57.6%) had clinical TR, defined by ≥ 2 of the following: "V" wave in JVP; pulsating liver; see-saw parasternal movement. Twenty eight pts did not have clinical TR.

Results: The most powerful predictors of clinical TR ($p < 0.01$ for all), determined by univariate analysis, are shown in the table. JA/RA ratio was a weaker predictor, whereas right ventricular (RV) function, PA pressure and tricuspid annular shortening fraction were not significant predictors.

	Sensitivity	Specificity	PPV*	NPV**
JA ≥ 9 cm^2	92.1%	71.4%	81.4%	87%
RA area ≥ 30 cm^2	65.8%	78.6%	80.6%	62.9%
Jet width at origin ≥ 0.8 cm^2	71.1%	71.4%	77.1%	64.5%
SFR*** in hepatic veins	81.3%	88.9%	92.9%	72.7%
Paradoxical septal	63.2%	82.1%	82.8%	62.2%
Diastolic septal flattening	83.8%	63%	75.6	73.9%

*PPV = positive predictive value; **NPV = negative predictive value; ***SFR = systolic flow reversal.

A multivariate analysis showed that the only independent predictor of clinical TR was SFR in the hepatic veins.

Conclusions: The strongest and the only independent echocardiographic predictor of clinically apparent TR is SFR in the hepatic veins. JA ≥ 9 cm^2, RA area ≥ 30 cm^2, jet width at origin ≥ 0.8 cm^2 and signs of RV volume overload may also be useful, especially when hepatic vein imaging is not feasible. Echocardiographic significant TR can be subclinical in a substantial number of patients.

1026 Nuclear Cardiology: New Approaches/New Agents

Tuesday, March 18, 1997, 3:00 p.m.–5:00 p.m.
Anaheim Convention Center, Hall E
Presentation Hour: 4:00 p.m.–5:00 p.m.

1026-110 Paradoxical Scintigraphic Underestimation of Ischemia in Patients with a More Severe Infarct Related Stenosis

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To assess the value of technetium-99m sestamibi (MIBI) scintigraphy in assessing post infarct ischemia within the infarct region, adenosine MIBI SPECT and dobutamine stress echocardiography (DSE) were performed in 51 patients (pts) with a recent myocardial infarction and correlated with the presence of a significant (DS > 50%) infarct-related stenosis (IRS) on quantitative coronary angiography. Regional perfusion activity was analyzed semi-quantitatively (score 0–4) on a 17 segmental left ventricular model. DSE was used for the estimation of the infarct size (low dose) and for concomitant evaluation of ischemia (high dose).

A reversible defect (Δ score ≥ 2) within the infarct region was observed in 20 of the 37 pts with a significant IRS (sensitivity of 54%) and only in one pt without a significant IRS (specificity of 93%). The scintigraphic detection of ischemia was fairly good in the pts with a moderate IRS (DS 51–64%) but was inadequate in pts with a severe IRS (DS ≥ 65%) (sensitivity of 80% versus 36%, $p < 0.01$), while the echocardiographic detection of ischemia was not influenced by stenosis severity (sensitivity of 73% in both subgroups). This scintigraphic underestimation of the ischemic burden was mainly related to a severely impaired resting myocardial perfusion, as was evidenced by a

Infarct stenosis:	Moderate	Severe	p-value
Ischemic burden: absolute Δ score	2.8 ± 1.7	1.33 ± 2.0	$p < 0.05$
PSI rest (mean ± SD)	2.1 ± 0.6	1.6 ± 0.7	$p < 0.01$
PSI during adenosine	1.7 ± 0.4	1.3 ± 0.6	$p < 0.05$